

## **ABSTRACT**

[0092] Disclosed herein is a method and system to reduce the area and power dissipation in digital filters or multipliers. Compared to radix-4 Booth coding the proposed method reduces the number of partial products by one, if the input signal has certain limits on its range. One exemplary application is echo cancellation in a full duplex pulse amplitude modulation system with 10 levels (PAM-10). Echo cancellation may be achieved by calculating a digital replica of the echo from the transmission channel. The replica signal may be calculated in a finite impulse response (FIR) filter, which multiplies the transmitted signal with estimates of the echo coefficients of the transmission channel. The replica signal may be subtracted from the received signal to create an echo-free receive signal. The disclosed method may reduce the number of partial products between the PAM-10 transmit signal and each echo coefficient from three, when radix-4 Booth coding is used, to two. This in turn may reduce the number of adders in each tap multiplier of the FIR filter from two to one, resulting in lower area, lower power dissipation, and potentially higher switching speeds.